Audiophile

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Computer Audiophile Pocket Server - C.A.P.S.

Submitted by The Computer Au... on Mon, 02/08/2010 - 17:15

Over the last several months I've researched different combinations of motherboards, computer cases, audio cards, and accessories that go along with these components. The goal of all this research was to put together a hardware and software music server solution that I would actually use and the Computer Audiophile readers could actually use. I would do the leg work, test & listen to everything, and provide the information for CA readers to put together the exact same music server. This sounds somewhat simple until one considers all the requirements that go into such an audiophile solution. Great sound, great looking, no moving parts, silent, fairly inexpensive, and 100% of the components must be available today. Along the way this server was named the Pocket Server by a colleague who was very surprise at its small size when I pulled it out of my carry-on luggage. The server is a bit larger today than it was at that time but the name hasn't changed. What follows is the story of the Computer Audiophile Pocket Server and all the information required to recreate the $1,500 C.A.P.S solution.

Jack of All Trades Master of None

Like many audiophiles I am never satisfied with the status quo. The status quo in computer based audio is to purchase a Windows based PC or a Macintosh, plug it in, and let 'er rip. That type of a solution works wonderful for the vast majority of the world's population and it's one I recommend frequently when the situation arises. Moving beyond the status quo many audiophiles including myself customize standard Macs and PCs until they're satisfied with the sound quality. This customization still does not address many of the issues inherent in a machine built for general computing and is often like polishing a turd. The CA Pocket Server Project began with a completely blank whiteboard. This way I had no turds to polish or in audiophile terms I had no jitter to clean up from the start. It's always better to build a fanless system rather than install inches of acoustical foam, fight with noise, and worry about other issues related to fans. That's the general thought process I used to approach this project. Plus, the always pertinent acronym K.I.S.S. Keep It Simple Stupid.

Requirements

The Computer Audiophile Pocket Server requirements were non-negotiable. I had to satisfy these requirements or the project would be a failure. I also elected to use many components that I haven't already discussed. I didn't want to rehash The Zalman or hFX based music servers I wrote about in 2008 and 2009. Those servers are still great, but don't meet all the C.A.P.S. requirements.

01. Absolutely silent.
02. Capable of great sound.
03. Great looking.
04. No moving parts.
05. Fairly inexpensive.

08. Easy to assemble / install
   *a.*Assembly / installation by one's self or
   *b.*Assembly / installation by local computer shop, son, daughter, neighbor, or friend.
09. Small size.
10. Low power consumption.
11. Low heat.
12. Accept an add-in card for audio or additional capabilities. Hardware & Software must accept appropriate add-in cards.
13. Play 16/44.1, 24/44.1, 24/88.2, 24/96, 24/176.4, and 24/192 all bit perfect.

Operating System

The first step in the process was to test different operating systems. I rules out previous versions of Windows, including the apparent audiophile standard XP, because they were not current. Copies of Windows XP (OEM) are still floating around some of the online shops, but I was ready to retire XP anyway. That left Windows 7 as the Microsoft based candidate. Building a Mac OS X based machine (Hackintosh) is of no interest to me as it violates the Terms Of Service of OS X and is more of a tweaker's system than most audiophiles are willing to accept. Beyond the mainstream consumer operating systems I used used a variant of Berkeley Unix called FreeBSD in addition to a few distributions of Linux. I ruled out FreeBSD fairly quickly. After using it for a few hours as a music server I concluded FreeBSD was better left to host web servers and other business type applications. I am very fond of FreeBSD and I really wanted to like it as a music server OS but squeezing a square peg in a round hole wasn't a goal of the CA Pocket Server Project. I spent much more time researching and using Linux based operating systems than all the others combined. As I said at RMAF 2009, and I still believe today, Linux is the future for music servers. The only caveat is Linux requires quite a bit of knowledge to setup as a music server. The amount of knowledge required is a show-stopper for 99% of the Earth's population let alone analog loving audiophiles. However, if I could satisfy the C.A.P.S. requirements I was willing to attempt writing an extremely thorough how-to Linux guide for CA readers to build this music server. The Linux based operating systems I used are Debian Linux, Voyage Linux, Puppy Linux, Arch Linux, openSUSE, Ubuntu Studio, and probably a couple more that I can't remember at this time. The final selection of an operating system for the C.A.P.S. server came down to Windows 7 and Voyage Linux.

Voyage Linux is an incredibly small operating system. It can fit on a tiny USB memory stick, compact flash drive, or any hard drive currently available. The initial installation requires about 128 Megabytes of disk space, not to be confused with 128 Gigabytes. Voyage installs as a barebones operating system. The user must add or update audio features such as Music Player Daemon (MPD), Advanced Linux Sound Architecture (ALSA), and other tools like NCMPC and Minion. There are countless options when using Linux. This is a great thing for most Linux users but can be overwhelming to those trying it for the first time. I forced myself to use Voyage Linux for many weeks. Without the option to jump over to a Mac or Windows based server one can become very well versed in Linux music servers. On the contrary one can quit using a Linux music server due to frustration if one doesn't have the necessary time and skills to work through problems. The Voyage based system I setup satisfied all but three of the stated C.A.P.S. requirements. Requirements 7,12, and 13 were constant battles. I tried a few different audio cards and had varying levels of success with each of them. I used an ESi MAYA44 and RME 9632 for much of the time. I was unable to pass 24/176.4 digital audio out of the ESi MAYA44. The MAYA44 data sheets proclaim support up to 24/192, but the user manual states clearly on page 34, *"Sample rate supports : 32, 44.1, 48, 88.2, 96, (192)kHz *Coaxial Output only."* Without 24/176.4 the MAYA44 card failed the requirement. The RME 9632 audio card was a different story. About 100 hours into the configuration nightmare I was able to pass bit perfect audio on all required sample rates. Configuring the RME 9632 in Linux was extremely frustrating. There are bits and pieces of outdated user generated documentation all over the Internet. If there is demand I will create my definitive guide to the RME 9632 on Linux. There are software, firmware, and hardware incompatibilities to work through. I'm really happy I put in the time to make it work on the C.A.P.S. server as I learned quite a bit in the process. Once I had the card working on all the required sample rates I still had problems changing sample rates on the fly when I switched audio tracks. I could not get this to work no matter what I tried. I did create scripts to change sample rates but each one had to be called up via command line before playing a track that required a sample rate change. This mix of problems is what lead me to exclude Linux from the list of possible operating systems. Requirements 12 and 13 combined equate to a system that is not easy to use. Audio cards with Linux support that also support the required sample rates are few and far between. The cards that do exist are not user friendly enough for most people to use on a daily basis. Canned servers, that one can purchase off the shelf, based on Linux and cards such as the RME 9632, RME HDSP AES-32, Lynx AES16 (with OSS drivers), or even the ESi Juli@ card have a bright future. Creating this type of solution at home for one's self is not for the average audiophile seeking to listen to music rather than fiddle with a computer. That said, I continue to use Linux in my listening room next to my other servers.

Note: The ESi Juli@ card supports all the required sample rates but can be very hard to obtain. I was unable to procure one during the several months of this project. Even with a Juli@ card a Linux based solution still does not meet the C.A.P.S. requirements.

Windows 7 satisfies all of the software based requirements. It is capable of great sound, it's a current OS, easy to operate and install, works with more hardware than any other OS, and is capable of bit perfect

64-bit Windows 7 I still think I would use the 32-bit version. There are no benefits to using a 64-bit operating system on the C.A.P.S. server. I selected J River Media Center 14 as the playback and library management application for the C.A.P.S. server. MC 14 has become my new go-to Windows based music application because of its features, flexibility, and bit perfect playback.

Hardware

The **motherboard** is the most critical component of the C.A.P.S. server. Without the right motherboard most of the requirements can't met. Readers not schooled in computer hardware should know a motherboard is the main board to which everything in a computer connects. The motherboard dictates what CPU can be used, how much memory can be used, how many and what type of hard drives can be used, and everything else that goes together to build a working computer. The first criterion I used to determine the best motherboard for the C.A.P.S. server was number four, no moving parts. There are many methods to eliminate moving parts from a motherboard such as the addition of passive cooling used in servers based on the Zalman TNN300 or hFX chassis. Adding passive or active cooling only increases complexity. I wanted a motherboard with no moving parts out of the box. Such a motherboard had to include passive cooling as part of the board's design. This requirement reduced the number of qualifying motherboards down to a handful. I had previously built a Linux based music sever using a motherboard from the swiss company PC Engines. These boards are very small, have incredibly low power requirements, but have too many limitations for the C.A.P.S. server. PCI slots, memory slots, hard drive capabilities, and operating system limitations were too much to overcome. One capability I really like using with a current PC Engines board I have is Power over Ethernet (PoE). This board receives all its power via an Ethernet cable. It's a nice bonus in the aesthetics department when one can remove the power cable from a component. After much research and testing I selected the mini-itx Intel D945GSEJT motherboard for the C.A.P.S. server (Photo 1) (Photo 2). This board has a built-in, non-removable, Intel Atom N270 1.6 GHz **CPU** that is passively cooled with low profile attached heat sinks. No CPU fan required. The Intel D945GSEJT has two SATA hard drive ports. Connecting standard SATA solid state hard drives (SSD) eliminates another source of moving parts from the server. Spinning hard drives are a source for noise, greater power requirements, increased heat, and can limit the computer case options. One feature that elevates the Intel D945GSEJT motherboard above others is the built-in full size PCI slot. This satisfies the requirement for add-in audio cards or additional capabilities. By additional capabilities I am talking about a PCI FireWire card to connect a FireWire DAC or FireWire hard drive for people using USB DACs.

Power requirement for the Intel D945GSEJT is very flexible. One can use a traditional computer power supply that connects to the board's 2x2 power port. These traditional power supplies are rarely fanless, rarely silent, and can decrease the number of computer case options due to mounting requirements. The Intel D945GSEJT also accepts an external 12 volt power supply similar to most laptops on the market. A silent fanless external power brick was easily my choice to power the C.A.P.S. server.

Other notable features of the Intel D945GSEJT include on-board S/PDIF digital audio output headers. Header is another term for pins on the motherboard to which one can connect devices. This output supports 16/44.1, 24/48, and 24/96 sample rates. A special cable is required (Photo 1) (Photo 2) to use this S/PDIF output as there are no built-in S/PDIF ports. A full-mini PCI Express slot is available for wireless cards or other devices like a hardware decoder to increase video playback capabilities. One of the USB headers on the D945GSEJT can be used for an eUSB solid state drive. I purchased an eight GB eUSB drive for this server (Photo 1) (Photo 2), but did not use it with the Windows 7 installation. Windows 7 will not install to a USB drive even if it's placed directly on the motherboard. I have installed Linux to this tiny drive without any issues. An underrated feature of small mini-itx motherboards is the network speed capabilities. Many small boards only contain 10/100 Mbps network cards. The Intel D945GSEJT has an on-board 10/100/1000 Mbps card commonly referred to as a gigabit Ethernet card.

The maximum amount of random access memory **(RAM)** the Intel D945GSEJT will accept is two GB in its only memory slot. The decision to use two GB of RAM doesn't require any thought or further discussion here. Just add to cart, it's cheap. Selecting a hard drive to meet the no moving parts requirement is easy if one has unlimited funds. Fortunately Solid State Drives **(SSD)** continue to decrease in price every week. At the time of this writing an OCZ Vertex Turbo 60GB SSD is $219. This is not the exact drive I used in the C.A.P.S. server but it's contains the same amount of disk space as the one I used. If I were putting together the C.A.P.S. server today I would purchase the OCZ drive previously mentioned. There is currently no way store most people's music collections on local solid state hard drives. The available sizes just aren't large enough without spending thousands of dollars on convoluted PCI/e SSD devices. That's why I selected a 60GB SSD. Most music must be stored elsewhere. My music is located on a Network Attached Storage (NAS) device. If an external spinning USB or FireWire drive is necessary then so be it. At least C.A.P.S. server is free from internal moving parts for now. In the future it will be possible to house all one's music locally on solid state storage.

Audio card selection for the C.A.P.S. server was fairly easy for me, a Lynx AES16. I am a strong supporter of the Lynx AES16 PCI card for its sound quality and its advanced capabilities. The Lynx enables one to use an external clocking device and supports dual wire AES. I used both of these features during the

sound, but it doesn't meet many of the requirements of this project. An audio card I would really like to use in the C.A.P.S. server is the ASUS Xonar Essence St. I currently have the STX PCIe version that will not work in the C.A.P.S. server as it doesn't have a PCIe slot. A few weeks ago ASUS provided me a prerelease ASIO driver for the STX card. I was very pleased to see the card now outputting bit perfect audio at 16/44.1, 24/96, and 24/192. According to ASUS 24/88.2 and 24/176.4 support will be part of the final ASIO driver version. The reason I mention all of this about a card that won't work in the C.A.P.S. server is because this driver also works for the ST PCI version of the Xonar Essence card. Since I haven't heard the ST version I can't comment on the sound quality. However if the quality is similar to the STX version with the new ASIO driver I will highly recommend the ASUS Xonar Essence ST card and consider it a great option for the C.A.P.S. server. The ST PCI version of the card is available for around $200 at many online stores.

During this project I researched a countless number of **computer cases**. I'm glad I did the research, but I could have saved all that time by selecting the case I originally wanted from day one of the project. The Origen^{ae} M10 computer case was clearly the best case for the C.A.P.S. server. Audiophiles not only like great sound, we like excellent build quality and products that look just as good as our audio components. The all aluminum (5mm) Origen^{ae} M10 case meets or exceeds all the requirements set out for the C.A.P.S. server. The case ships with a 60mm fan, but it's only required if the internal components need additional air flow. I never took the fan out of the box. The M10 is built for a mini-itx motherboard such as the Intel D945GSEJT. Installation is very simple. Origen^{ae} provides the four required screws to attach the board to the bottom of the case. The 2.5" 60GB SSD selected for the C.A.P.S. server screws easily onto the inside panel right next to the SATA power and data cable ports on the motherboard (Photo). Also included is a mountable tray to hold a slim slot-loading CD/DVD drive. I didn't install such a drive as I wanted to keep things very simple and I had no need for an internal CD/DVD drive. I used a USB CD/DVD drive to install Windows and I use a different computer to rip my CDs to the easily accessible NAS device. If I did install a DVD drive I would select the Pioneer DVR-TS08 slim slot-loading SATA drive for under $60. The M10 case features a very nice looking front display and hidden infrared sensor. I was unable to utilize these features because the Intel D945GSEJT motherboard has a power incompatibility with the M10. The M10 ships with its own 150 watt external power supply but I was unable to make it work with the Intel D945GSEJT motherboard. The D945GSEJT would not accept power via the 2x2 connector and the internal case electronics required a 20/24 pin motherboard connection, that the D945GSEJT doesn't have, to function properly. This incompatibility may have a silver lining. Audiophiles are always seeking ways to turn off unneeded features or capabilities and frequently use single purpose components such as a DAC with separate power supply or separate external clock. Turning off a component's display is nothing new to audiophiles either. This time there is no option to turn the display on or use the included remote control. I don't know if the lack of these features reduces any electrical noise inside the case but I'm willing to bet an argument could be made in support of such a reduction. Again, this is strictly because I selected a motherboard that was not 100% compatible with the M10 case. I've read other reports of these features working very well. In fact with a compatible motherboard it would be possible to control applications like J River Media Center via the infrared remote control. The Origen^{ae} M10 case supports half-hight PCI cards sitting vertically in the motherboard's PCI slot. I placed an ASUS Xonar HDAV 1.3 Slim card into the PCI slot and it lined up perfectly with the hole to screw the card into place stabilizing it with the unique internal metal frame of the case. The M10 can also accommodate full size PCI cards like the Lynx AES16 and ASUS Xonar Essence ST by use of a PCI riser card (Photo). A PCI riser card simply enables the PCI card to mount horizontally instead of its native vertical placement. I know of no detrimental effects by using such a riser card. I was initially concerned about heat dissipation as most of the motherboard rests underneath the horizontally mounted Lynx AES16 card. Thus far I've yet to experience any heat related issues. I've even listened to four hours straight of 24/176.4 HRx material outputting dual wire AES to a DAC without a single hiccup and the M10 case is cool to the touch. Inside the case the Lynx AES16 card is no hotter than any other installation I've seen. The bottom of the Origen^{ae} M10 case features four metal with rubber bottom feet. The feet are tall enough to allow placement of the case on short carpeting and the rubber bottom of the feet enable one to place the case on any surface without scratching. I currently place the M10 case on carpet in my listening room instead of behind a wall where my other music servers reside. The case looks very nice and I have no reason to hide such a component. This placement also allows me to use short AES cables from my Lynx AES16 card to my DAC. Overall I don't consider the power incompatibility an issue. I would purchase this case without the extra features were it available in such a configuration. Plus, I personally user remote desktop for control of the server and wouldn't use the I R receiver or front panel anyway.

Use of a **monitor** is not something I normally consider with my music servers. The Intel D945GSEJT does have analog DSUB and digital DVI video outputs. One of these is certainly required for system setup and could continue to be used if necessary. Seeking to add something extra to the C.A.P.S. server I contacted the nice people at Mimo. A few days later an iMo 7" Pivot Touch USB monitor arrived at my door. On paper or computer screen this touchscreen monitor seems too good to be true for only $199. Unfortunately it is too good to be true. I used the iMo 7" Pivot Touch on Windows and Mac system before concluding it wasn't my cup of tea. Connected to the C.A.P.S. server I had nothing but trouble using this little touchscreen. Initial setup wasn't very smooth, but I was eventually able to see my desktop on the iMo. Next I went through all the calibration steps to fine tune the touchscreen. Calibration is pretty simple, but when it came to actual use the iMo was a nonstarter. If I had infant size fingers I

thing I can say about the iMo Pivot Touch 7" touchscreen is that it may work as neat display similar to how Jeff Kalt of Resolution Audio used the non-touchscreen version at CES this year. I do not recommend people purchase this monitor before using it themselves. Needless to say the iMo 7" Pivot Touch did not make the cut to be part of the C.A.P.S. server.

Comparison

Compared to a Zalman TNN300 based silent music server the C.A.P.S. server comes out very well. The two main benefits of the Zalman baed server are disk space and the ability to use PCI Express cards in addition to PCI cards. The Zalman is also capable of handling more memory. Both servers are absolutely silent with no moving parts. The Origen^{ae} M10 based C.A.P.S. server is far more visually appealing than a Zalman TNN300. The Zalman case is no longer manufactured although there are plenty left in the supply chain here in the U.S. The C.A.P.S. server case is $320 and the Zalman TNN300 is 690. Not a single component in the Zalman servers is less expensive than coresponding C.A.P.S. serve component. The C.A.P.S. server (9.5" x 4" x 9.8" w\ feet, 6.6 lbs.) consumes far less space than a TNN300 (13" x 9" x 18.5" 32.5 lbs.). The CA Pocket Server is an excellent way to use a Lynx card in one's system without planting a huge PC tower next to audio components. I think both the C.A.P.S. and Zalman based servers are capable of similar great sound quality.

Wrap-Up

The Computer Audiophile Pocket Server project was frustrating at times but well worth the time, money, and effort. Make no mistake the C.A.P.S. server will never be a commercial product that benefits Computer Audiophile financially. This server was created to be a great solution for myself and CA readers alike. There are an unlimited number of ways to change this configuration or adjust it to one's personal needs. No single configuration is the right configuration for everyone. Despite some technical terms weaved into the article this is a really easy music server to build as a whole or in part. I know many people who like to dig into projects like this and I also know many people who want nothing to do with a computer project. Fortunately the C.A.P.S. server was created with both groups of people in mind. Using off the shelf parts currently available to anyone CA readers can undertake this project themselves or simply call up a local computer shop and have them put it together. Whether one builds it, buys it, or brushes it off is irrelevant. The Computer Audiophile Pocket Server's purpose is to increase one's enjoyment of our wonderful hobby.

The Computer Audiophile Pocket Server piece by piece

Motherboard

- Intel D945GSEJT Johnstown Mini-ITX Motherboard - $109.00

Power Supply

- Power Adapter DC 12 V, 80 W - $29.00

RAM

- TRANSCEND 256MSQ64V6U SO-DIMM DDR2 667 Memory 2GB - $73.00

Solid State Drive

- OCZ Vertex Turbo OCZSSD2-1VTXT60G 2.5" 60GB SSD - $219.00

PCI Riser

- PCI Riser Card for D945GSEJT - $10.95

Digital Audio Card

- Lynx AES16 PCI Audio Card - $625

Computer Case

- Origen^{ae} M10 - $320

Music Application

- J River Media Center 14 - $50

Other bits and pieces used during the C.A.P.S. Project that did not make the final build.

Hardware Decoder

- Broadcom BCM970012 - PCIe Mini Card - $59.00

Solid State Drive

- Emphase 44-pin Industrial Flash Disk Module 4 GB - 4000X - $69.00
(Windows installation too large for 4GB version)

Solid State Drive

- OCZ 16GB PATA PCIe Mini Solid State Drive - $151.69
(Will not fit on Intel D945GSEJT motherboard)

Solid State Drive

- ATP eUSB SSD 8GB Z-U130 - $139
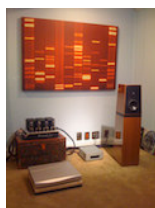(Windows can't be installed to this drive)

Wireless Card

- Intel Wifi Link 5100 802.11a/b/g/Draft-N PCIe Mini Card - $29.00

Wireless Antenna

- Wireless Dual Band Antenna, 108 mm (4") and Pigtail Cable - $17.00

Click To Enlarge Photos

C.A.P.S. Server in my listening room.

Stock Photos of Origen^{ae} M10

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Chris Connaker

Founder
Computer Audiophile

» Login or register to post comments

Submitted by cfmsp on Mon, 02/08/2010 - 19:47. Joined: 08/10/2008 .:. Offline .:. Comments: 2302

shame about Linux

Chris,

it's a shame about the challenges of Linux. Like you, I believe it to be the OS of choice down the road for purpose-built audio servers.

until then, I'm fine with Mac OS X.

nice article,
clay

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Submitted by silverarrows on Mon, 02/08/2010 - 21:17. Joined: 02/08/2009 .:. Offline .:. Comments: 38

Excellent article

I've been looking at what would be needed to build a Windows 7 based server and this is exactly the type of thing I was looking for. For me I would probably lean towards a Zotac IONITX board with the NVIDIA graphics card. It also has built in s/pdif optical/coax outputs to give some time to eventually put in the Lynx AES. I would also use iTunes as it is bit perfect, from my understanding, with Windows 7 32-bit.

Thanks for this Chris!

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Submitted by Iam Kirk on Mon, 02/08/2010 - 21:48. Joined: 10/15/2008 .:. Offline .:. Comments: 101

Linux OS's

Can you expand any more on your linux OS experiences. I see Arch Linux there. How did you like

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Submitted by ldolse on Mon, 02/08/2010 - 21:52. Joined: 08/20/2008 .:. Offline .:. Comments: 164

ESI Juli@

If you haven't been able to acquire the Juli@ I'd recommend this site:
http://www.djdeals.com/egosystemsJULI@.htm
Found via pricegrabber.com, and I'm almost certain I acquired my Juli@ from them a year or so ago. The
North American ESI Disti is KaySound - http://www.kaysound.com/.

I'm curious as to why the Linux system would fail your requirements even with the ESI card. With Voyage
Linux, were you able to run that on the Intel board? I know it can be difficult to get Voyage running on
systems the distribution owners didn't specifically target.

This may sound like a repeat of the complaint with the Peachtree DAC, but I'd really like to hear more about
how these different Operating Systems/new hardware combos sound in a shootout, since you have the luxury
of listening to them side by side, something quite difficult for the majority of us to duplicate. I'm particularly
interested in Linux - despite the shortcomings you highlighted it's of interest to a number of readers, and the
extra effort/shortcomings may be worthwhile for some readers if the sound quality is there.

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Submitted by The Computer Au... on Mon, 02/08/2010 - 22:28. Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi ldolse - Nice to see you

Hi ldolse - Nice to see you commenting on this article as I know you are a big supporter of Linux and likely
understand it as well or better than many readers. I did check every source in the country for Juli@ cards and
nobody had them in stock. I couldn't even get one from the distributor because it didn't have them either.

The Linux system with a Juli@ would fail the requirements for the C.A.P.S. because it wasn't user friendly
enough. It could certainly be made user friendly enough but not by the average CA reader. I don't think the
average reader can setup a NAS connection that references a stored encrypted password file and mounts at
boot time without pulling their hair out. This is one of many issues that users would run into and that can't
really be novice-proof because they require user specific information a user may not even know. I've been
asked what an IP address is many times :~) You and I can do this stuff blind-folded but not most of the CA
readers. Plus, a really tweaked Linux system is the topic of a different article.

The sound quality from my Voyage Linux server outputting USB to the dCS system was truly wonderful.

_____

Chris Connaker

Founder
Computer Audiophile

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Submitted by Jammrock on Tue, 02/09/2010 - 00:33. Joined: 09/02/2009 .:. Offline .:. Comments: 11

Windows 7 ... on a stick

Excellent write-up!

You actually can run Win7 from a USB drive, and ergo an eUSB drive, with a little work. Here are some
online guides I have seen.

_____
Whatever works.

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comments

Submitted by The Computer Au... on Tue, 02/09/2010 - 00:40. Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi Jammrock - Thanks for the

Hi Jammrock - Thanks for the kind words and links. I appears that the links only show how to create a
bootable installation USB drive. They don't say it's possible to actually install Windows on a USB drive. Did I
misread the links?

_____

Chris Connaker

Founder
Computer Audiophile

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Submitted by Jammrock on Tue, 02/09/2010 - 01:12. Joined: 09/02/2009 .:. Offline .:. Comments: 11

One of those is definitely an

One of those is definitely an install link. Must have copied the wrong one. The other I have not
tested (I lack a big enough USB drive at the moment) but I will try if I can dig up a drive.

There is an option two, and that is boot from a VHD on the USB drive. VHD = Virtual Hard Drive. VHD's are
the files used for all Microsoft virtualization from Virtual Server/PC to Hyper-V. It's a bit trickier, but I'm told
it works.

http://www.garrymartin.com/blog/2009/10/native-vhd-boot-windows-7-or-win...

_____
Whatever works.

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Submitted by rudyy on Tue, 02/09/2010 - 03:44. Joined: 10/31/2009 .:. Offline .:. Comments: 16

Computer Audiophile Pocket Server - C.A.P.S.

Very nice, Chris.
My first post on this forum was to seek information on custom-built computers. regardless of operating
systems.
I really wanted to buy one with Linux.
I did what I could (for someone who knew little about the numerous so-called Linux distributions), but
ultimately could not find a Linux distribution I could work with.
My notes tell me I tried Ubuntu 9.04 and several others, including at least one that was specific to media
applications. (Ubuntu had been recommended to me at some online web site.)
For a music player I tried acidrip, sound juicer, amarock2, audacity, rythmbox and potamus; none of them
did everything I needed.
I finally gave up on Linux, just as I had done about 7 years ago when I bought a Red Hat version on floppy
disk; I couldn't get it to fully load.
For at least one reason (related to golf) I have to keep a Windows OS computer, so I keep a Vista laptop, but
I'd sure like to rid myself of it and just rely on my iMac for everything, despite iTunes' inability to keep my
music library organized.

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comments

Submitted by johniboy on Tue, 02/09/2010 - 06:52. Joined: 04/20/2009 .:. Offline .:. Comments: 81

remote and atom cpu

Hi Chris,

Nice setup and thank you for sharing your experience in such detail! A quick question:
I believe you control the music server using remote desktop / iphone or ipod touch, right? So you need a
wireless connection. Does the motherboard have a wlan chip? If not, do you use a wlan usb stick for this
purpose?

When I was experimenting with my music server, I first used a single core centrino cpu. This was not
satisfying, because the wlan stick / remote desktop application took up too much cpu usage when scrolling
though my albums. It resulted in hickups. Then I switched to a dual core and the problem was gone. One cpu
for the remote, one for the playback... Did you experience anything similar with the atom cpu??

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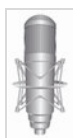
Submitted by aps on Tue, 02/09/2010 - 09:50. Joined: 04/04/2009 .:. Online .:. Comments: 54

AES16 versus Firewire / USB output

Chris

Thanks for the excellent article. I have, to-date, assumed that my next audio computer would use eithe
firewire and/or async USB to get digital audio to an external DAC. This would, seemingly, reduce cost and
product great sound. What, then, was the thinking behind using AES16 sound-card (which is, undoubtably, a
great piece of kit)?

Regards,
APS

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comments

Submitted by bmckenney on Tue, 02/09/2010 - 11:49. Joined: 11/03/2009 .:. Offline .:. Comments: 156

I have a serious question.

I have a serious question. Is there any benefit to this type of server over a Mac Mini with some
tweaks like a SSD? It seems to me a Mac Mini (headless) would be cheaper and simpler and still
meet all the requirements. Add in an async USB or FW DAC. Anyway, just curious what your thoughts are on
the pro's and con's of a custom server like the Pocket Server verus a Mac Mini. Especially interested in sound
quality differences but I understand the player software won't be the same.

Bryan

_____

Dedicated 240V balanced power, Torus RM20-BAL. Mac Mini/Ayre QB-9. LSA Group Signature integrated. Eminent Tech
LFT8B speakers. Real Trap and GIK bass traps.

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comments

Remote Control

Hey Chris,

i am entirely of your opinion. Your how-to is perfect!

There is only one question: you do not use the touchscreen, so how are you controlling the system? It is relatively easy to integrate an IR control, but useless without a screen.

THX

Bernhard

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Submitted by The Computer Au… on Tue, 02/09/2010 - 14:46. Joined: 11/28/2007 .:. Offline .:. Comments: 6744

Hi johniboy - The motherboard

Hi johniboy - The motherboard has a mini-PCIe slot that accepts a wireless card. I listed this wireless card at the bottom of the review as a component that didn't make it into the final server build. The card snaps into place right on the board. It's simple to install, but I didn't need it because I have a wired gigabit Ethernet switch close to my system. I'm glad you brought up the remote control & weak processor issue. I originally had the issues you described. Then I disabled or removed many of the programs that run in the background and eat system resources. Right now the server hiccups a tiny bit upon the initial Remote Desktop connection but after than I am able to browse my collection in a controlled manner without issues. I can reproduce the hiccups if I start clicking all over the place and scrolling really fast through all the albums lie a madman. It just takes a little usage to understand how best to operate the server via remote desktop. I don't think it's a problem now or I would never have published such a system.

Hi APS - Good question about why I use an internal sound card. Right now this card allows playback of all critical sample rates into 99% of the DACs on the market. It also has advanced features that allow me to externally clock the card and use dual wire AES into a DAC like a dCS Debussy pictured in the article. I am a big fan of Async USB and FireWire DACs. Either would work great with this server. However, the FireWire DAC options are somewhat limited. I highly recommend products from Daniel Weiss and the Sonic Studio Model Four. Both have FireWire inputs. Also, the Async DACs I've review and listened to over the years are really wonderful. Right now support for 176.4 and 192 isn't widely available. If a reader wants this capability he is limited to very few DACs that may not meet his sonic quality standards or price point.

Hi Bryan - Oh no a "Serious Question!" Only joking of course. Thanks for the Mac Mini related question. There are many benefits to this system over a Mac Mini, but most of them are subjective. The objective benefits are a totally fanless / no moving parts design, 100% silent from any distance, support for internal audio cards, and it doesn't set off those Mac allergies in many audiophiles :~) Also, as I touched on above a Mac Mini limits one to USB or FireWire. For many people this is totally acceptable. I wasn't satisfied with that limitation, but I did build in the ability to remove or exclude the Lynx card in favor of a PCI FireWire card. That would bring the cost down close about $600. In terms of sound quality both a Mini and the Pocket Server are capable of great sound. they both sound different that's for sure.

Hi Bernhard - I am controlling via Remote Desktop from another computer. The Pocket Server does have analog DSUB and digital DVI video outputs that allow it to connect to many displays. Running J River in theater Mode with the server connected to a nice display would be a really neat and visually appealing system.

_____

Chris Connaker

Founder
Computer Audiophile

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Submitted by Socrates7 on Tue, 02/09/2010 - 15:26. Joined: 10/07/2009 .:. Offline .:. Comments: 579

symposium)? Comparisons, or it didn't happen! Schnell! Schnell!

Also, I have a local dealer working on a similar design. Pretty nifty stuff, and love to see a Lynx card stuffed into such a small form factor.

Based on some other conversations going on elsewhere on this site, I'm guessing that off-board power is/should be a must. But Windows 7? That's tough to take. ;-)

Anyway, I'm also guessing here, but I'm assuming that a wired keyboard and wired monitor will be preferred over a wireless for those persnickety concerns over having a broadband broadcaster sitting in your rack, no?

_____

Scot

PowerMac G5 >> ART Legato >> Berkeley Alpha >> Système du Jour

"I might remind you that whilst your ears are on the side of your head mine are near the top and may well hear nuances that you cannot."

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Submitted by Valvefan on Tue, 02/09/2010 - 15:39. Joined: 01/28/2010 .:. Offline .:. Comments: 4

NAS and C.A.P.S

Hi Chris,

Thanks for the awesome article on the C.A.P.S.

I'm using a windows laptop and external HD as a sever. the system is pretty quiet but not silent.

I've never set up a NAS before. Can Vista or Windows 7 be set up to connect directly to a NAS via wired ethernet or is a router required. I might be able to put a NAS in another room to reduce the HD noise. Can jRiver MC14 easily find my music library via the LAN connection?

Thanks for the help

Valvefan

External HD>eSATA >Vista laptop>jRiver MC14>USB>Ayre QB9>Pass Labs X- preamp>Blue Circle BC 204 amp>Cabasse Farella 401 speakers

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Submitted by The Computer Au... on Tue, 02/09/2010 - 18:31. Joined: 11/28/2007 .:. Offline .:. Comments: 6744

Hi Scott - Yeah, Windows 7 is

Hi Scott - Yeah, Windows 7 is tough to swallow for several readers, but for others it's all they want. For this server I wanted an OS that people would purchase anywhere and would be available for a while. You are right about the persnickety concerns and using wired keyboard, mouse, and monitor. The sound compared to other computers used at the Symposium is different. Windows based machines sound different than Mac based machines and XP different from Windows 7. I have confidence that Windows 7 can be made to sound better than XP. Right now my XP, G5, Mac Pro, and MacBook Pro servers are on the sideline. I've gravitated to the C.A.P.S server.

Hi Valvefan - Yes, any current operating system can connect directly to a NAS without a router. J River will automatically find all the music located on the NAS as long as you map a drive to it or point J River to the right folder. The thing to do is connect the NAS directly to the computer with an Ethernet cable. Most likely your computer or NAS will automatically cross-over the cable so a special cable is not required. You will have to assign a manual IP address to the NAS and your computer so the two can talk to each other. If you only have one network port on your computer you won't be able to access the internet or anything other than the NAS drive.

Founder
Computer Audiophile

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_____

Submitted by vortecjr on Tue, 02/09/2010 - 18:55. Joined: 04/18/2009 .:. Offline .:. Comments: 779

Chris,

at the risk of sounding like a copy cat....I ordered that very Intel D945GSEJT MB, backplate
and ram for an unrelated venture. I'm not ready to discuss what that venture is at the moment, but that
should be enough to say I like the MB. L.S. told me about the MB and the backplate a few fews weeks ago
when I asked them about new MBs with PCI and SATA and minimum 2GB of ram. I don't think that the
M10 case is quite ready to except that backplate because the backplate was meant for another case. BTW that
case is only $35 bucks, but you loose the cd option. I could be wrong, but the AES16 card looks a bit funny in
the M10 case;) I really like the idea of the fanless design and the external power adapter or power brick as
some call them. That junk does not belong inside the music server! I have something very close to this (my
personal unit in the pic) with a mini-itx MB with VIA chip, OCZ ssd, fanless case, 4 GB ram, Windows 7 and
firewire to my Minerva and I love it! I use M.M. because the iTouch app rocks IMO. Someday we will have
WASAPI and I will be golden.
A side note about Linux with all do respect to your attempt here to try it. My buddy Clay says, "it's a shame
about the challenges of Linux." I say it's a shame you did not ask me to help! I understand that my input
might spoil the project as a vender, but we should be able to look past that. I agree that Linux poses some
challenges moving forward. However, Andrew has been working very hard with me to bridge the gap and
make it accessable to anyone willing to try it. For sure you started out with some Linux software distributions
that are to hard core for the average Joe. At the same time your building the Windows 7 machine from
scratch so installing Andrew's Linux distribution should be on par! Andrew's Linux distribution is also 100%
free to use without limitations and it is geared to rip music, store music, and most importantly play music
with MPD. My install guide is posted here on CA if anyone is interested. As it stands you need to download the
iso, burn the image to a cd and install the software. Then you set the dac from a web gui config page and your
ready to go with the on board outputs or a usb dac. Yes, the AES16 card takes a few extra entries at command
line and some configuration. The extra entries and config would be a copy and paste exercise. Firewire is still
pretty hard, but we are working on it and it is supported.

Jesus R
www.sonore.us

_____

Sonore Fanless Music Player W/Vortexbox Engine -> Playback Controlled from iTouch or Web GUI-> no Mouse, no Keyboard, no
Monitor....no Problem -> Lynx L22 & Lynx AES16

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comments

_____

Submitted by jbpsrca on Tue, 02/09/2010 - 20:40. Joined: 04/26/2009 .:. Offline .:. Comments: 16

Great article chris. Question

Great article chris.

Question - what audio driver do you use with win7 and j river for the lynx card? I'm assuming the asio4all is
out of the picture, as it was a legacy version that used to be in favor?

Thanks!

_____

out: Windows 7 > Media Monkey > asio4all > Lynx AES16e > Redco custom Gotham AES/EBU cable (70ft) > Antelope DA
Clock > Harmonic Technologies Magic Digital 1 AES/EBU cable > Berkeley Alpha DAC > AudioQuest Cheetah RCA
interconnects > NuForce Ref 9 v2 SE amps > Nordost Red Dawn II speaker cables > Magnepan 3.6R speakers.
vinyl in: Lucid AD9624 > Redco custom Gotham AES/EBU cable > Lynx AES16e > Windows 7 > Goldwave

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Submitted by The Computer Au... on Tue, 02/09/2010 - 21:03. Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi jbpsrca - I've had great

Hi jbpsrca - I've had great luck with the regular ASIO driver and selecting the Lynx card via the config in J River. WASAPI has been a bit troublesome for me with bursts of distortion and some scary noises infrequently. Since you are using the AES16e card things may be a bit different.

_____

Chris Connaker

Founder
Computer Audiophile

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Submitted by IamKirk on Tue, 02/09/2010 - 21:49. Joined: 10/15/2008 .:. Offline .:. Comments: 101

Chris

What was experience like with Arch Linux? Was voyage selected because of the nycparamedic alix project?

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Submitted by The Computer Au... on Tue, 02/09/2010 - 22:03. Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi IamKirk - I used Arch for

Hi IamKirk - I used Arch for a very short time. Nothing about it made me "have to have it." Whereas Voyage was awesome and I thought it beat everything else hands down. I researched distributions seemingly forever and even thought about creating my own CA Linux distribution. I couldn't find one better than Voyage for what I wanted to do. Since Voyage is based on Debian there are a lot of avenues for bouncing ideas off other people and a fair amount of documentation on the OS. nycparamedic initially got me into Voyage on the Alix boards.

_____

Chris Connaker

Founder
Computer Audiophile

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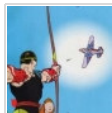
Submitted by chasm on Tue, 02/09/2010 - 23:53. Joined: 01/22/2010 .:. Offline .:. Comments: 4

*****

Chris,
Five stars. Best exposition on the subject I've seen anywhere, along with the rest of your material on this site.
I have two questions:
1. Why J River over MediaMonkey, Foobar, or the others?
2. Can you recommend an online primer on setting up a PC from scratch? Like, once you get the hardware assembled, how do you load the OS? Basic stuff for us neophytes who are willing to dip a toe in the water.

Thanks so much for your efforts.
Chuck

Submitted by The Computer Au... on Wed, 02/10/2010 - 02:29. Joined: 11/28/2007 .:. Offline .:. Comments: 6744

Hi Chuck - Thanks for the

Hi Chuck - Thanks for the nice comments.

"1. Why J River over MediaMonkey, Foobar, or the others?"
I've been researching applications for a while now and concluded that J River Media Center is currently the best Windows based application available. I recently visited the J River office and was very impressed at the level of knowledge there and the willingness to work with people on getting things done right. The guys also understand audiophile sound quality and what it means not to mess with the bits. This app is extremely powerful and I will go into a lot of detail when I publish a thorough J River Media Center 14 article in the near future.

"2. Can you recommend an online primer on setting up a PC from scratch? Like, once you get the hardware assembled, how do you load the OS? Basic stuff for us neophytes who are willing to dip a toe in the water."

There are probably tons of them around but I can't point you to any right now. I'm sure people here are willing to help get you though any problems you may encounter or initial questions you have. Just open a topic in the forum and hopefully you'll get to where you need to be. Installing the OS is really easy :~)

_____

Chris Connaker

Founder
Computer Audiophile

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Submitted by EuroChamp on Wed, 02/10/2010 - 03:36. Joined: 01/25/2010 .:. Offline .:. Comments: 10

Remote Control

Hi Chris!

RDP is the remote control of your choice?
You build a fanless mediaserver and you control it with a notebook? (which is in front of you). Do you shut down the notebook, after you have selected the track you want to hear? Because the notebook will be much louder than the mediaserver, which is far away.
;-)

We should find a good solution for remote control (iPod maybe) - or we should find a good touchscreen next to the mediaserver, like Meridian Sooloos.

When I come home, I want to listen to music, and not work on the computer.

Am I wrong?

Bernhard

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comments

Submitted by The Computer Au... on Wed, 02/10/2010 - 03:51. Joined: 11/28/2007 .:. Offline .:. Comments: 6744

Hi Bernhard - I control my

Hi Bernhard - I control my servers with a MacBook Air that sits next to my listening chair. I usually open and close the Air when I need it or am done changing something. The Air goes to sleep and wakes from sleep

I agree, when I listen to music I don't want to work but I also need full control of my servers as I change advanced setting often to check sonic differences etc...

_____

Chris Connaker

Founder
Computer Audiophile

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Submitted by EuroChamp on Wed, 02/10/2010 - 11:19. Joined: 01/25/2010 .:. Offline .:. Comments: 10

Remote Control

Hey man! This is the first real application area for the iPad. :-) We will see, if and when the guys of J.River, Mediamonkey & Co will release a nice plugin. Apple will be the winner in this race, I think.

The notebook, even a Mac Air, is a no-go for me.

I am IT system administrator, so I am a MS$ guy. But nobody offers a nice application designed for touchscreens. And Apple has iTunes and the iPod, that works. Amarra is a nice upgrade, indeed.
Windows Media Center (Windows7) is a great application, but it is not bit perfect. It would be the program i prefer.
I will have to order a touchscreen monitor and test all the (bit perfect) programs out there. Today you can buy computer cases with a 7 inch touch integrated in the front. They are more expensive, but you do not need an extra monitor.
The rest of the hardware, you selected, is really very nice, totally silent and low power consumption.
I think, some persons want one single server for video, too. Then they need more graphics power for Full HD video. It is possible to build it noiseless.
So - let's stay tuned.

Bernhard

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Submitted by BobH on Wed, 02/10/2010 - 15:23. Joined: 10/03/2008 .:. Offline .:. Comments: 689

Remote control..

I just thought it might be worth mentioning that a nice monitor, located somewhere near to the listening position, together with something like the Logitech MX Air mouse might be an elegant solution for anyone simply looking for a way to control playback.

_____

Bob

CAPS(EssenceST)-->Tact 2.0s-->Audio Reseach 100.2-->Martin Logan Vista

Login or register to post comments

Submitted by av_passion on Wed, 02/10/2010 - 16:48. Joined: 09/18/2009 .:. Offline .:. Comments: 21

Great article, thank you

Chris,

What a great article. Thank you for doing all of the work, the research, the testing and the trouble shooting. This makes building a great music server achievable and relatively painless. Thank you.

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Submitted by ldolse on Wed, 02/10/2010 - 19:08. Joined: 08/20/2008 .:. Offline .:. Comments: 164

The guy who wrote MPOD for

The guy who wrote MPOD for the iPhone and MPD is looking at re-designing things for the iPad. This would have some great potential for a remote control application. If you're willing to give Linux a go then you could leave some feedback for him on what you'd like in the ipad version here:
http://www.katoemba.net/makesnosenseatall/2010/01/30/ipod-mpod-ipad-mpad/

Regarding mounting the network share, I've been working on a custom distribution for MPD, and I didn't have a problem using the mount command in rc.network:

```
mount-FULL -t cifs //ipaddress/sharename /mnt/music -o username=username,password=password
```

Getting the right packages to use that command in Voyage may be more difficult, not sure. I was using Puppy Linux, which can also be set to read only like Voyage, though they use a different technique to accomplish it. I agree that even this could be complex for some users, but essentially what the user needs to know is the IP address, sharename, and user/pass - pass is optional if you can configure guest access on the NAS. All is plain-text.

Guess I should get around to finishing that distribution and instructions...

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Submitted by av_passion on Wed, 02/10/2010 - 19:55. Joined: 09/18/2009 .:. Offline .:. Comments: 21

Great article, thank you

Chris,

What a great article. Thank you for doing all of the work, the research, the testing and the trouble shooting. This makes building a great music server achievable and relatively painless. Thank you.

James

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Submitted by jbpsrca on Wed, 02/10/2010 - 22:30. Joined: 04/26/2009 .:. Offline .:. Comments: 16

asio driver followup

Thanks Chris. Is it still th v.67 asio driver you are using, or have you moved to the current release (v2.1?).

Unfortunately, I get infrequent clicks, and sometimes extended distortion, with the v.67 asio driver under win7 32 bit w MediaMonkey. Haven't tried asio v2.1 yet.

For now, I've switched to wave_out, which is stable. Doesn't seem to be as magical, tho (haven't done critical back to back listening yet). Is wave_out same thing as WASAPI? I also see a Direct Sound this weekend, but haven't tried it yet.

I'll switch to J River this weekend. Thanks for all the tips and research. Love this site!

_____

out: Windows 7 > Media Monkey > asio4all > Lynx AES16e > Redco custom Gotham AES/EBU cable (70ft) > Antelope DA Clock > Harmonic Technologies Magic Digital 1 AES/EBU cable > Berkeley Alpha DAC > AudioQuest Cheetah RCA

comments

Submitted by The Computer Au... on Wed, 02/10/2010 - 23:56. Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi jbpsrca - Yeah with my

Hi jbpsrca - Yeah with my Lynx and MediaMonkey I use the 0.67 ASIO driver. I've been using ASIO4ALL version 2.1 and it works great with USB devices. I haven't tried it with the Lynx yet. When you use J River just select the ASIO option. There really is no need to install ASIO4ALL v. 2.1 unless you have issues.

I'd move away from wave_out as it's pretty easy to change the bits with the slightest misconfiguration. Wave_out is not the same thing as WASAPI. This of WASAPI as the brother of ASIO :~)

_____

Chris Connaker

Founder
Computer Audiophile

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Submitted by hubsand on Thu, 02/11/2010 - 04:35. Joined: 10/13/2008 .:. Offline .:. Comments: 78

******* Music Server

Looks like you're not the only one liking the ******* board as a Windows 7 music server: ********* Audio's recommended computer audio rig goes down that route much more cheaply. They don't like iTunes, although they share Chris' love for JRiver . . .

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Submitted by hubsand on Thu, 02/11/2010 - 04:48. Joined: 10/13/2008 .:. Offline .:. Comments: 78

Touchscreens soon

A touchscreen would be the ideal control and display solution for this system, but we're not quite there yet: I suspect the technology will really take of in 2011, triggered by wider application support.

Although the Pocket Server looks really cute, there's a weird contradiction at its heart: it was painstakingly designed for bit-perfect 24/192 audio from the ground up, yet it only has 60GB storage: how many albums exactly can you fit on that SSD at that quality?!

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Submitted by gvb on Thu, 02/11/2010 - 05:39. Joined: 02/11/2010 .:. Offline .:. Comments: 3

Linux still a viable option

Hi Chris and everybody else. Thanks for this site which provides a wealth of information. I have had so far only browsed through the many topics, but this one made me think I have some knowledge I should share.

I believe the choices made here are great ones. However I would like to point out that I do think Linux is still

The issue with Linux is to have a sound card that has good driver support with ALSA (ALSA is the current sound infrastructure in the Linux kernel). This restricts the possibilities a bit. But the Juli@ (and other cards using the Envy24HT chipset) is supported. I think Juli@ is superior to other Envy24HT cards because it has two clocks. This card makes for a relatively unexpensive and effective digital I/O. However, the card's breakout cable is indeed a disaster. There are some DIY discussions in the web regarding better connections, for those that have the patience to deal with that.

Now for the requirement #7. First I would like to comment that not all players are created equal in the Linux space, in particular for FLAC. FLAC decoding is typically embedded in the players, so mplayer and MPD (for example) produced different results on the same file. Some FLAC files, in particular the ones with "exotic" sample rates can be a problem. Much to my surprise, the most consistent player was also the one with the best user interface (in my opinion) - XBMC, from xbmc.org. While primarily a multimedia player, it behaves flawlessly with FLAC files, sending their decodes directly to the sound card with no manual sample rate switch anywhere. I haven't tested other music file formats.

Two comments about XBMC. One: its installation was a breeze. I just had to install Ubuntu from the live CD - no fancy options or tricks there. Then, the XBMC site provides a few instructions to add the XBMC repository to the source list in your Ubuntu system. Next, it is just one command to install it. One other comment: XBMC (or any Linux player, for that matter) will not do bit-perfect output out of the box. You will need to create a file called .asoundrc that creates a virtual device that plugs straight to the hardware, bypassing the ALSA mixer. Then you have to choose that virtual device as your output in XBMC. I can provide details on that if required.

And one last comment: I think everybody would agree that the Lynx AES16 is a better I/O than the Juli@. To my knowledge (I hope I can be corrected) the Lynx card is NOT supported on Linux. The other promising multiple sample rate interface is the M2Tech Hiface, but for the moment this one is only a promise as far as Linux goes.

Sorry for the long post, but I hope this contributes to the dialog. Again, I don't think this Linux/Juli@/XBMC alternative disqualifies in any way the choices made by Chris.

Gerson

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Submitted by Elprior on Thu, 02/11/2010 - 07:30. Joined: 11/05/2008 .:. Offline .:. Comments: 189

Hi Chris, excellent article

Hi Chris,

excellent article !

I am precisely in the mood for a silent computer near my dac.
I was looking to the Atom platform too, and am already using JRiver MC14 (very good piece of software).

Just a few questions :
1) Is the Atom powerful enough to use the theater view ? I just could not make it work on windows xp with a core 2 duo laptop (and a crappy nvidia graphic card) and asio ouput : the ouput kept dropping, depending on the cpu load (asio issue ?).
I am to say that I use flac files. But outside theater view, the cpu load hardly hit 1%.
Using a loudy pc, under w7 bits, with a nvidia 7600gt, and the very same system, I could not suffer a single dropout in theater mode. So any figure/claim about the Atom stress would be greatly appreciated.
2) Are you playing from memory ? I love this feature really, this eliminates the need for streaming through the network.
3) What about this Debussy baby ? How does it compare through its usb input against the linx setup ?I know, this is too early a question :(

Thanks,
Elp

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migrate audiofiles from mac to caps hd

Thanks for this great piece.
Is it possible to move the itunes music files (aiff) to be used in CAPS?
I am afraid that re-rip is mandatory?

_____

Pure Music/Dac202/LebenXS/MagicoV2 Stealth cables www.bluedy.com

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Submitted by One and a half on Thu, 02/11/2010 - 09:05. Joined: 04/12/2009 .:. Offline .:. Comments: 176

Small Drive

The SSD is great for the OS. Music files can be stored on external drives, cause the streaming rate is pedestrian compared with the processing you need.

_____

Sony VAIO F127 Win7 64bit, Sony STR-DA5400ES AV Receiver, Halide Design Bridge, Accuphase E-450, Accuphase DAC-20 , KEF Reference Three Speakers, Yamaha YST1500 Sub Woofer, Custom Teflon 12guage speaker cables, AQ Copperhead interconnects.

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Submitted by silverarrows on Thu, 02/11/2010 - 11:23. Joined: 02/08/2009 .:. Offline .:. Comments: 38

Broadcom BCM970012 - PCIe Mini Card

Looking at the pictures, would this card fit in if the AES card is installed with the riser? While the goal is to build the best server for audio, I would like to have HD playback as well.

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Submitted by hubsand on Thu, 02/11/2010 - 16:21. Joined: 10/13/2008 .:. Offline .:. Comments: 78

Atom-based music server

The Atom is perfect for this job, but to be more widely useful, it needs reasonably meaty graphics: the Ion board is perfect and runs Win 7 64-bit no problem.

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comments

Submitted by hubsand on Thu, 02/11/2010 - 16:23. Joined: 10/13/2008 .:. Offline .:. Comments: 78

More space!

The SSD is great for the OS. Music files can be stored on external drives, cause the streaming rate is pedestrian compared with the processing you need.

-- Why have the SSD at all, in that case? Why not just put the OS on the external drive, too . . . once the player app is loaded, there's very little HD activity resulting from the OS or player anyway.

comments

Submitted by The Computer Au… on Thu, 02/11/2010 - 16:34. Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi silverarrows - The

Hi silverarrows - The Broadcom card fits easily under the Lynx. It snaps into place perfectly with plenty of room to spare.

_____

Chris Connaker

Founder
Computer Audiophile

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comments

Submitted by The Computer Au… on Thu, 02/11/2010 - 16:36. Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi bluedy - It is 100%

Hi bluedy - It is 100% possible to play AIFF files from iTunes on the C.A.P.S. server. Using J River Media Center I played back my from my iTunes music folder to make sure this worked.

_____

Chris Connaker

Founder
Computer Audiophile

Login or register to post
comments

Submitted by The Computer Au… on Thu, 02/11/2010 - 16:51. Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Husband - It appears that you

Husband - It appears that you are the Registrant of the domain that you are directing people to. I can only assume you are posting here for you own benefit and looking for free advertising. Your site sells audio components that readers here are possibly interested in. Consider this your one and only warning. More posts talking about products you sell or linking to your own Store will result in an immediate ban from the site.

_____

Chris Connaker

Founder
Computer Audiophile

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comments

Submitted by hubsand on Thu, 02/11/2010 - 17:21. Joined: 10/13/2008 .:. Offline .:. Comments: 78

Understood.

Understood. No linking to sites with possibly interesting things. Or at least, not interesting things we have a vested interest in.

We're not box-shifters, and we don't sell PCs: as a service, we publish our 'reference' spec so people can buy the bits for themselves wherever they can find the best price: just as you have done here. Neither of us profit financially by this, other than by reputation and site traffic.

The differences between proposed DIY music servers seems worth discussing: your recipe centres on the Lynx card: I'm not convinced this is money well spent, but I'm open to persuasion! Our recipe incorporates a linear regulated power supply: you apparently feel this is less important: we should (all) chat about it . . . it's a forum.

hu(b)sand

Login or register to post
comments

Submitted by The Computer Au... on Thu, 02/11/2010 - 17:32. Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi hubsand - Thans for the

Hi hubsand - Thans for the response although the smart ass comment, "No linking to sites with possibly interesting things" is a little disingenuous. That said I totally agree we all benefit from discussing every option available. You can certainly accomplish this without directing people to your website where you sell audio equipment. Allowing these links is a slap in the face to the paid advertisers who support Computer Audiophile and allow me spend all this time working on these projects and improving the site.

Thanks for your understanding.

_____

Chris Connaker

Founder
Computer Audiophile

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comments

Submitted by hubsand on Thu, 02/11/2010 - 18:06. Joined: 10/13/2008 .:. Offline .:. Comments: 78

Got it.

Got it: also no advertiser-slapping. Maybe we should advertise: PM me...

But to the music server: in our experience following a minimal path reaps rewards: the Lynx card (as opposed to the Zotac Ion's Realtek SPDIF drivers) seems on the face of it to be an over-elaboration.

The Zotac board is also equipped with enough video processing muscle to do double-duty as a BluRay source (therefore more generally as a HTPC). It's passively cooled, and has no wireless or on-board DC conversion: all good, I would argue. The coax socket can be upgraded to a WBT or similar, but no break-out leads are needed: HDMI, optical and USB audio out are all inbuilt

Given the necessity of a large HD (which can easily be located in a quiet box 60cm away), the SSD seems redundant, too.

Conversely, powering it with an evil SMPS seems cruel: there are places where one can buy under-regulated linear PSUs outputting 12.5V quite inexpensively, so I hear. I believe it pays to prevent interference from piggy-backing on the coaxial or USB audio output, but at the very least, substituting an audio-grade power supply for a switching device will benefit anything else attached to that section of the mains.

The net effect of trimming what appears at first to be excess fat could result in a major cost saving: something like $1000, which surely could be better spent elsewhere in the system . . . and more attention paid to the cleanliness of the power looks like an upgrade. Your recipe looks great, though: it just looks expensive.

On the software front, I think we're completely on the same page: Linux, or Windows 7 + JRMC + WASAPI, the implementation of which we too are really impressed by in V14.

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comments

Submitted by Jammrock on Thu, 02/11/2010 - 20:42. Joined: 09/02/2009 .:. Offline .:. Comments: 11

SSD and ION

How many albums on 60 GB? Well, 60 GB using the SI system equates to 55.9 GiB (GibiBytes, or giga binary bytes) usable by Windows. Assume about 20 GB for OS, pagefile, apps and required free space and you have about 35.9 GB for music. With FLAC compression you're looking at ~350 MB per CD album, divided by 35.9 GB and you get roughly 102 albums, assuming full length.

If we move into something like the HRx space you get about 690 minutes with 176.4/24 FLAC, or about 10 albums. Which is not a lot, but then there isn't a lot of 176.4/24 content out there yet. Of course the 60 GB SSD is only a suggestion.

You can get 120-164 GB SSDs for slightly more cash already. The newly announced second gen Kingston SSDNow V is a good example, with Win7 TRIM support, garbage collection, good performance and a $377 MSRP for the 128 GB version.

Since the HDD is the noisiest and slowest part of normal computers these days, going SSD and sacrificing some space is by far the better option for a truly silent PC. Then use a NAS, SAN or media server elsewhere with your big disks and stream music in if needed.

I too wondered why the an ION board was not chosen, then I started to look at them. While they are significantly better in the video space, most of them come with active cooling on the heatsink which defeats the "no moving parts" qualification. I would personally wait for ION2 to come out before reevaluating the motherboard. Even better performance using even less power due to a die shrink and some chip tweaks. That should give more passively cooled options.

I think the best cost saving for the CAPS will be the Asus Xonar Essence ST[X], assuming it has a solid WASAPI driver or gets a solid ASIO driver. At less than $200 you save a bundle over the Lynx AES16 and don't have to shell out for a custom cable.

A CAPS with the upgraded SSD, Xonar Essence, ION2 and minus the custom cable would drop the price by about $225, assuming the motherboard costs $100 more. And it would make a pretty mean HTPC as well.

_____
Whatever works.

Login or register to post
comments

Submitted by The Computer Au... on Thu, 02/11/2010 - 21:37. Joined: 11/28/2007 .:. Offline .:. Comments: 6744

Hi jamrock - I received an

Hi jamrock - I received an updated ASIO driver for the Asus Xonar Essence ST[X] this afternoon. Full support for 88.2 and 176.4 :~)

_____
Chris Connaker

Founder
Computer Audiophile

Login or register to post
comments

Thanks for all this great information. This is very educational to us newbies and your willingness to respond to all of the comments and questions makes this one of the best places on the internet. Soon, I will build a server for myself. THANKS!

Login or register to post comments

Submitted by hubsand on Fri, 02/12/2010 - 03:53. Joined: 10/13/2008 .:. Offline .:. Comments: 78

Ion & Space

Jammrock: 60Gb is fine for MP3s: you squeeze loads of albums on an iPod.

But seriously, well-heeled audiophiles building a music server are surely not going to hobble its performance with a compressed format (like FLAC), not when such a leap in sound quality comes for free by using AIFF or WAV. The CAPS is built from the ground up to pass 24/192 . . . so let's talk about the space overhead: that level of quality comes at the price of roughly a meg a second, 60Mb a minute, 17 minutes per Gigabyte, maybe 12x single album CDs on a partially occupied 60gb drive -- assuming a streamlined 5Gb OS -- 24 albums per 60gb drive if we deal in 24/96.

Assuming we're still talking about music lovers, we're in the realm of 200-album collections (minimum!). Even in 16-bit, that's a lot of space. We just need to forget about SSDs until they become economically viable in terabyte capacities. QED.

The Zotac Ion 230 board has a single Atom chip, passive cooling (no fan) and no DC conversion: only the dual-core 330 needs a fan: the more powerful (and less suitable) 330 board also 'features' DC conversion and wireless: no, no, no.

The linear PSU + Zotac Ion 230 recipe costs less than $500 (£350 in my part of the world) plus OS and case. The power supply is much better, and (plus a $100 BD-ROM) it does BluRay without a glitch.

But I am curious about building the system around the Linx card: if in audition it bests the Realtek SPDIF drivers on the Zotac, then maybe it justifies the cost . . .

Login or register to post comments

Submitted by The Computer Au... on Fri, 02/12/2010 - 05:36. Joined: 11/28/2007 .:. Offline .:. Comments: 6744

"But I am curious about

"But I am curious about building the system around the Linx card: if in audition it bests the Realtek SPDIF drivers on the Zotac, then maybe it justifies the cost . . ."

Hi hubsand - I connected the special cable pictured in my article directly to the S/PDIF headers on the motherboard. I was so displeased with the sound I could barely listen. The Lynx is a great card and it's very versatile for external clocking and dual wire applications.

_____

Chris Connaker

Founder
Computer Audiophile

Login or register to post comments

Submitted by hubsand on Fri, 02/12/2010 - 07:54. Joined: 10/13/2008 .:. Offline .:. Comments: 78

Only one way to tell . . .

The UK price of the Lynx card is scary-expensive (double that Stateside), but we'll import the bits and audition the Lynx with an Atom ITX board. Unless anyone has built one locally and fancies a bake-off?

There is a board with PCIe, a fanless single core Atom and Nvidia Ion for bluray: see here:
http://www.overclock.co.uk/product/Point-of-View-NVIDIA-ION-Intel-Atom-2...

This would probably also run the Asus Xonar card, too . . .

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Submitted by Jammrock on Fri, 02/12/2010 - 08:08. Joined: 09/02/2009 .:. Offline .:. Comments: 11

Essence ST[X]

Can't wait to hear your opinion on the Essence ST[X] with the updated ASIO driver! I've been eyeing that card for a long time.

_____
Whatever works.

Login or register to post comments

Submitted by Jammrock on Fri, 02/12/2010 - 08:30. Joined: 09/02/2009 .:. Offline .:. Comments: 11

Ion, FLAC & Space - Fight!

I agree 60 GB is not a lot, thus my 128 GB suggestion, but again it is a moot point if you have a good home network with a media server or NAS with multiple TB's worth of storage. And that's the point made in the article. The CAPS is a great front-end, and that's what it's designed for, not necessarily a media server.

Audiophiles love their separates after all and that can easily translate to the CA niche.

FLAC = Free Lossless Audio Codec. Lossless being the key word...besides free. I've done bit comparisons between WAV output and FLAC output and they are identical. There is no reason to shun FLAC because it uses compression when you save about 50% on disk space and end up with identical audio quality. It does use more CPU than WAV but an Atom can handle high res FLAC with ease.

I am interesting in your ION, Lynx experience. Drop me a PM if you make a write up.

_____
Whatever works.

Login or register to post comments

Submitted by Audio_ELF on Fri, 02/12/2010 - 08:34. Joined: 03/16/2009 .:. Offline .:. Comments: 2554

Xotac Ion

Just a thought - but Husband menationed two or three times the Zotac Ion motherboards - but IIRC these don't have PCI slots?? There is a ASUS motherboard with Atom / ION chipset with a PCI slot (but has a fan) and another from a company called POV or Point of View (which IS fanless).

Eloise

_____
Mac OSX 10.5 with iTunes (mostly ALAC) --USB--> Musical Fidelity A1008 --> B&W CDM 7NT (iPhone remote)

Submitted by baocrazy on Fri, 02/12/2010 - 09:29. Joined: 02/12/2010 .:. Offline .:. Comments: 4

Question on your test with Linux

Hello Chris,

Great article.
I am too very interested to build a Linux Music Server.
I was wondering if you talked to Alsa people about the impossibility to output the sound automatically (a la Amarra) with the original sample rate. If so, what was their answer?

Baocrazy

Login or register to post
comments

Submitted by hubsand on Fri, 02/12/2010 - 09:40. Joined: 10/13/2008 .:. Offline .:. Comments: 78

Motherboard suitability

Only the new Synergy boards from Zotac have PCIe slots. None of their other boards need it for 2-channel audio: they all have SPDIF coax on board. It's a cheap socket, but with a good cable, it sounds superb.

The POV board may be perfect: it has PCIe, no fan and does BluRay, but the quality isn't as good as the Zotac. Actually, most Atom boards with heatsinks don't need the fan . . . .

What's twisting my melon right now is the possibility of obtaining better digital throughput using a dedicated card (like the Xonar or Lynx). Zotac's implementation is very lean: there's almost no power overhead, and that enables the system to run pure, clean and streamlined on a 90W linear regulated supply. Powering a motherboard-sized, audiophile-grade soundcard designed for D-A, then not using 90% of it, makes my Occam's Razor twitchy.

At least the Asus is sensibly priced: presumably the perfect card for this application is the best shielded, but lowest spec version?

I wonder whether a smarter alternative is simply to retrofit a Zotac board with an isolated WBT coax . . .

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Submitted by ldolse on Fri, 02/12/2010 - 10:00. Joined: 08/20/2008 .:. Offline .:. Comments: 164

@baocrazy, If the application

@baocrazy, If the application is configured correctly then ALSA will change sample rates on the fly. The trick is to bypass the mixer, and write directly to the hardware.

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comments

Submitted by The Computer Au... on Fri, 02/12/2010 - 10:24. Joined: 11/28/2007 .:. Offline .:. Comments: 6744

Hi hubsand - Are you sure

_____

Chris Connaker

Founder
Computer Audiophile

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Submitted by gvb on Fri, 02/12/2010 - 10:40. Joined: 02/11/2010 .:. Offline .:. Comments: 3

re: Question on your test with Linux

"I was wondering if you talked to Alsa people about the impossibility to output the sound
automatically (a la Amarra) with the original sample rate"

This can be done with ease, but it is not really a feature of ALSA directly, but rather of the driver for the
specific card, under ALSA. Thus, you may experience different results according to the card or chipset you are
using.

I can tell you that it can happen as you described with the Intel HD Audio ALSA driver, with the Realtek
chipset. It also happens with the ESI Juli@. I didn't have good results with an old Creative Sound Blaster.

ALSA has a mixer, alsamixer, which is the default route for all sounds in the system. The mixer resamples
everything to 48KHz. So the casual user of ALSA will not get bit perfect output. In order to achieve the bit
perfect output, you have to bypass the mixer and plug directly to the hardware.

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comments

Submitted by hubsand on Fri, 02/12/2010 - 10:42. Joined: 10/13/2008 .:. Offline .:. Comments: 78

24/192 v 24/96

Chris: Support for 24/192 is spotty, granted. And considerably software-dependent: preferred
WASAPI on our streamlined system was fine with 24/192 but not 24/88.1, for instance. However,
reaching for 24/192 was less of a priority than standardising on a rock-stable 24/96 platform . . . we're not
convinced that 96+ sample rates are relevant for the foreseeable future.

Getting the domestic industry to 24/96 is already a titanic (but very worthwhile) struggle. I take the view that
diminishing returns, compatibility issues, availability of music, and file sizes all count heavily against 24/192
for the next 2-3 years. In fact, for playback I manually resample our 24/88.1 and 24/192 files to 24/96 in
Soundbooth Pro. 'Originals' get archived, future-proof. No problem.

I do admit that our recipe priorities were different: I didn't set a 24/192 requirement. But we did cast in stone
that it had to be BluRay capable, and not use a switch mode power supply.

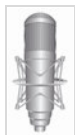Login or register to post
comments

Submitted by baocrazy on Fri, 02/12/2010 - 11:38. Joined: 02/12/2010 .:. Offline .:. Comments: 4

Thanks for this

Thanks for this information.

Do you have some url to share on how to realise that with those two soundcards you mentionned?

Login or register to post
comments

Submitted by aps on Fri, 02/12/2010 - 11:43. Joined: 04/04/2009 .:. Online .:. Comments: 54

DVD Drive?

Chris

The build doesn't appear to have a DVD drive? I've always thought that this minimalism makes sense (given that I can rip on another computer) but wouldn't it make installation and/or upgrades of the OS much harder?

Cheers,
APS

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Submitted by ldolse on Fri, 02/12/2010 - 21:41. Joined: 08/20/2008 .:. Offline .:. Comments: 164

@baocrazy Not sure if you

@baocrazy

Not sure if you were looking for links from me, anyway here is the info for MPD, which is the app I would recommend on Linux:

Check this thread for a detailed discussion for using plughw and hw for writing directly to the hardware, and how to check the sound subsystem to see that the sample rate is changing:
http://www.computeraudiophile.com/content/Auraliti-Music-Player-and-DAC

This isn't about sample rate, but how the latest builds of mpd can pad the differently bits for some DACs
http://www.computeraudiophile.com/content/New-mpd-feature-cleaner-signal

As long as I'm talking about mpd, I did mention in the one thread that WAV and AIFF id3 tags work flawlessly in MPD. I have since found one flaw - using the default libaudiofile sound library mpd uses for WAV/AIFF playback will actually attempt to play the tag, which comes out as a sub-second burst of static. The latest builds in GIT allow the use of libsndfile library, which doesn't have this problem, though it does have an issue with not updating the progress bar in clients, though this new issue is purely cosmetic.

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Submitted by Afveep on Sat, 02/13/2010 - 00:09. Joined: 07/27/2008 .:. Offline .:. Comments: 36

Chris- Comparison to a Mac Mini?

Chris-
An excellent article and obviously the result of an immense amount of work. It does beg the question though of the end result (sonics only) vs. a very simple Mac Mini solution with Pure Vinyl, for example. The $1500 target price does not appear to include about $180 for Windows 7, unless I'm mistaken, bringing the total cost of the CAPS solution to about double that of a Mac Mini and PV.

I can certainly understand the immense value of this solution for those who are not interested in a Mac-based server, have a "bug" for an iTunes-based player, or have the desire, as you state, for more flexibility for an external clock or for use with a DAC that can accept only AES or SPDIF.

Given that you have considerable listening experience amongst the various servers in your own system, my core question is whether you (or anyone else here) believe that this CAPS server provides a "material" sonic improvement over a mac/Amarra Mini (24/96 only) or PV (24/192), etc. off-the-shelf solution when used with a common DAC (obviously one that could also accept FW or USB). I'm not comparing this to a full Mac pro/Lynx solution, which obviously is not cost competitive.

Thanks again for a great article!

MacBook Pro with Pure Music/ iTunes & PS Audio PWT --> PS Audio PW DAC; Spiral Groove SG2 TT w/ Triplaner arm &
Ortofon A90 Cartridge --> ARC Ref 2 Phono Pre --> Concert Fidelity CF-080 Preamp --> VAC Phi200 Monoblock amps --> NOLA
Baby Grand speakers.

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Submitted by hubsand on Sat, 02/13/2010 - 06:57. Joined: 10/13/2008 .:. Offline .:. Comments: 78

Mac v PC

We recently ran several auditions of our $500 dedicated Windows 7 digital transport (of similar spec
to the CAPS*) against MacMini and MacBook equivalents, running PureVinyl. The MacBook was
audibly less 'artefacted' than the Mini but the only way the MacBook could reach the level of the Windows
machine with a moderately good coaxial interconnect was via a very high quality USB cable -- and only then
when using a DAC with well implemented USB input.

As a die-hard Mac user, it really pains me to say that, for the same money, a Windows 7 machine generally
sounds better, and runs BluRay.

Chris' version uses the (very) expensive Lynx card and drivers, which in principle offers even higher quality
digital-out, and the possibility of entering the DAC via AES/EBU, which is almost always a definite plus. We'll
be building this, and the Xonar/ASIO based version mentioned above, and running some comparative
auditions in the next few weeks, but as things stand, Windows or Linux digital transports have some
persuasive advantages, unless you're committed to end-to-end excellence in USB or FireWire.

* No Lynx card, but BluRay capable and with a linear regulated PSU.

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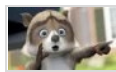
Submitted by Andrew S. on Sat, 02/13/2010 - 14:07. Joined: 06/28/2009 .:. Offline .:. Comments: 258

Nice Chris

Chris
Very well researched, written and comprehensive write up. Thanks for the obvious effort you put in. Pretty
thankless task putting your head above the parapets.

IME Linux & MPD is perfect with USB Dacs (partic async) and not alot else - it's just too much of a PITA to
configure anything requiring a driver to achieve automatic sample rate switching - RME and Lynx have both
defeated me..life's too short. Having said that, along with Amarra, MPD has given me the best playback sound
I have experienced from a computer digital transport.

I run Win7 64 on my current Lappie - Asus UL30, SSD, M2Tech HiFace, J River 14 and Wasapi out: no
problem at all with latest (beta?) 64 Hiface driver from Marco. No stutters or distortion. Very nice sound.

The Hiface (esp BNC) is a nice alternative to the Lynx esp for lappie users or those on a budget:). Not as good
for sure but a whole lot less expensive and works really well.... if Marco would just release linux drivers for it I
would be a very happy little vegemite.

Cheers
A

_____
Thanks for sharing....

Login or register to post
comments

Very nice setup, Chris, but i'm wondering about whether PoE is good enough. As I have written elsewhere, I'm have a strong suspicion that when a good power supply vastly improves the sound from the Sq.box, even when only the digital output is used, then the power supply of a music server is also likely to have an important influence. Something that forum members are also speculating on in the thread about the G5 vs. the Mini.

As I understood your article, you also have the option to use a "real" power supply. Have you tried comparing it with PoE?

_____

PC -> Squeezebox Duet with Bolder Cables Power Supply -> Toslink (yes, sounds better than coax) -> Emm Labs DAC2 -> 2 x Pathos Classic 1 mk III (bridged) -> Verity Fidelio Encore

Login or register to post comments

Submitted by The Computer Au... on Sat, 02/13/2010 - 16:30. Joined: 11/28/2007 .:. Offline .:. Comments: 6744

Hi Encore - PoE was only an

Hi Encore - PoE was only an option for the Alix PC Engines board I used on another server. The CAPS server requires power from the external supply or a more traditional internal computer power supply.

_____

Chris Connaker

Founder
Computer Audiophile

Login or register to post comments

Submitted by ldolse on Sat, 02/13/2010 - 17:01. Joined: 08/20/2008 .:. Offline .:. Comments: 164

Power Supply Options

It seems to me that the power supply is the one component of this system that could use an upgrade. I've been wondering if the aftermarket squeezebox power supplies would be compatible with the Intel or Alix boards. I can't find enough info to confirm 100%, but I suspect the answer is yes. I was looking at Welborne Labs:

http://welbornelabs.com/squeeze.htm

Never heard back from them when I emailed them inquiring about the same though.

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Submitted by ahp on Sun, 02/14/2010 - 00:28. Joined: 02/14/2010 .:. Offline .:. Comments: 2

Intel® Desktop Board D410PT ?

Chris,

I'm thinking about building my own solution based on your great article. Since I'll be using an Ayre QB-9 I won't need the sound card, making the system much cheaper to build. But I'm also thinking about using Intel D410PT motherboard since it can support 4Gbyte memory and 64bit operation. This would generate 10W heat instead of the 2.5W generated by the D945GSEJT you are using. Do you see any compatibility or heat issue with the D410PT?

Thanks for the answer in advance.

Submitted by EuroChamp on Sun, 02/14/2010 - 03:01. Joined: 01/25/2010 .:. Offline .:. Comments: 10

Hey ahp, you will not need

Hey ahp,

you will not need the 4GB, nor will it be an advantage, when you use 64-bit. You should prefer the 32-bit version. On the other hand, the mainboard of your choice does only support 100MBit networkspeed. No problem when you play 16/44.1 files, but the 24/192 files are much bigger. You will get longer interrupts, when you load the tracks over the network.

Bernhard

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Submitted by iamimdoc on Sun, 02/14/2010 - 10:10. Joined: 05/16/2009 .:. Offline .:. Comments: 131

For neophytes (and near neophytes)

For those of us who have never built a computer (but have replaced a few parts, added boards)

1) Could a Compact Flash Card be used instead of a SS drive? The guy at Frys's though it could and would be cheaper

2) Could the sound card be left out entirely if one were satisfied with USB DAC sound for now?

3) Can you explain how one gets the operating system onto the drive (without a CD/DVD drive)? Or the music player software? Or the drivers for my NAS drives (Iocell and Maxtor drives)?

Sorry if this is readily apparent to others...

Login or register to post comments

Submitted by The Computer Au... on Sun, 02/14/2010 - 10:33. Joined: 11/28/2007 .:. Offline .:. Comments: 6744

Hi iamimdoc - Good

Hi iamimdoc - Good questions.

1) Could a Compact Flash Card be used instead of a SS drive? The guy at Frys's though it could and would be cheaper

This is certainly an option, but there is no free lunch. Most CF cards are very slow and really not designed to host an OS like Windows.

2) Could the sound card be left out entirely if one were satisfied with USB DAC sound for now?

100% yes.

3) Can you explain how one gets the operating system onto the drive (without a CD/DVD drive)? Or the music player software? Or the drivers for my NAS drives (Iocell and Maxtor drives)?

I use a USB CD/DVD drive for the OS install and down the rest of the software via Internet.

_____
Chris Connaker

comments

Submitted by Jammrock on Sun, 02/14/2010 - 11:16.   Joined: 09/02/2009 .:. Offline .:. Comments: 11

Win7 64-bit vs 32-bit

It is my personal opinion that the 64-bit versions of Vista/Win7 are more stable than the 32-bit versions. I know a lot of people who will agree with that assessment, too. Furthermore, I have never run into any application incompatibilities running a 32-bit app on a 64-bit OS, nor are there any performance degradations for doing so.

It is also very rare to find a device maker who does not make 64-bit drivers for their devices. The Lynx AES16 has Win7 64-bit drivers, as do all the Intel, nvidia, AMD/ATi, RealTek, ASUS and all major providers. There is honestly no reason for the average user not to use 64-bit considering that is the direction the market is heading...and not just for Windows...and that is offers better stability and future proofing.

As for the memory amount question, you don't need 4GB but it doesn't hurt either. Every operating system has the so called "sweet spot" where adding more RAM no longer improves system performance. For Windows 7/Vista that is 4 GB, for XP it is 2 GB. I can't tell you the sweet spots of Linux/OS X, but I'm sure they have them.

The reason for this is because of system caching. The operating system will cache all of the background processes and application into a RAM cache which allows the system, especially Win7, to respond "snappy". On average my Win7 install will cache ~1.6 GB of the operating system to RAM. With standard system security running (anit-virus, anti-spyware/malware, firewall), a few tray programs running and a some apps open you use about 1-1.75 GB of active RAM. That totals to just under 4 GB, which is where the 4 GB sweet spot comes from.

And let's face it, 4GB RAM is super cheap these days. There's no real reason not to go with 4GB.

_____

Whatever works.

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Submitted by liorms on Sun, 02/14/2010 - 16:12.   Joined: 04/20/2009 .:. Offline .:. Comments: 27

Vortexbox LINUX & FW option

Hi Chris,

That is a lovely well written article - which provides, with all the discussion around it ; a perfect tutorial.
I'm looking for such a solution for last 1.5y and my main problem was the OS. Similar to you, my immediate "suspect" for the case was the Origen M10 and fanless MOBO design (your article came like a present from heaven...).
Lately I've found a *free* linux distribution that acts as a server + player ; the player part was added only on the date of 1-Feb-2010 and therefore it might have skipped your radar while doing the tests.
The distribution could be downloaded from www.vortexbox.org - it does include a commercial part where they offer a fully integrated solution ; still the linux distro is FREE for download.
I've installed it on an OLD pc Pentium 2 / 266MHz & still works... for 16/44.1 ; it does hit a snag with 24/96 but your HW setup will run 24/192 with no issues.
The distribution supports the Lynx AES16 and FW and more ; It also support a Squeezebox setup as a server to manage the files and a few more options including the recently added MPD based player.
Installation of the vortexbox is something like next->next->next... (no prior linux knowledge is required) ; All working out of the box...

Q: As a WEISS Minerva owner and user I'd like to fit a FW card into your design + installation of Vortexbox 1.1 to complete the FW solution.
In that case what FW card will you recommend using? ; As none was mentioned in the article BOM and it is well known that one should use a card with TI chip set to comply with PRO audio and the Weiss HW (both 4" and 6" outputs will be appreciated).

Regards,

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Submitted by The Computer Au... on Sun, 02/14/2010 - 20:03.   Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi Lior - Here is a link that

Hi Lior - Here is a link that covers FireWire cards for Weiss DACs.

http://www.computeraudiophile.com/content/Which-PCIe-Firewire-Card-Will-...

_____

Chris Connaker

Founder
Computer Audiophile

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Submitted by liorms on Sun, 02/14/2010 - 23:27.   Joined: 04/20/2009 .:. Offline .:. Comments: 27

FW and linux / vortexbox

Hi Chris,

My question was intentionally about the mix of linux (Vortexbox/fedora) and FW support, as I've already experienced issues with my Lenovo X61 (WIN XP) ; and bought an additional PCMCIA FW card with TI Chipset.
As the OS support is important, I was wondering what is the best choice for linux/fw card combo?

BTW - you did not comment anything on vortexbox distro ; what is your take on this?

Regards,

Lior./

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Submitted by The Computer Au... on Mon, 02/15/2010 - 00:11.   Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi Lior - I'm not sure about

Hi Lior - I'm not sure about the right FireWire card for Linux and the Weiss DAC.

I have not used the Vortextbox software yet, but hope to use it soon.

_____

Chris Connaker

Founder
Computer Audiophile

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Hi Lior!

I contacted Daniel Weiss recently to ask if he will provide a Linux driver for the weiss dac.
He's actually working on it now since the soon to come Weiss media server will run Linux.

For other firewire cards, the new audio firewire stack should be available in most of linux distribution soon.
See these links:
- http://www.ffado.org/
- http://www.ffado.org/?q=devicesupport/list

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Submitted by debt_collector on Mon, 02/15/2010 - 09:37 . Joined: 10/26/2009 .:. Offline .:. Comments: 24

A slightly different approach... but is it sensible?

Thanks for the article Chris. It's really informative and helpful! I wish i read it before I built my HTPC Unfortunately, I already built my HTPC six months ago and I took a slightly different path. My HTPC was designed to play music and HD video unlike the C.A.P.S. But my main aim was to build a server with a brief similar to Chris'. I wanted it to play audiophile quality music so I chose the Lynx AES16e for music. I also wanted the HTPC to play high quality HD video so I settled on a fanless nvidia 9550 card. Ideally, I would have liked it to have no moving parts to make it completely silent so I used an SSD drive for my OS (Windows 7).
At the time, my HTPC wasn't built as a completely fanless unit but I was aiming to construct a near silent system. I used the Asus P5Q-EM Mobo with an E7600 dual core CPU. Unfortunately, my choice of MoBo and CPU meant that I needed to use two silent case fans.
I am thinking of changing the MoBo and CPU to make my system completely fanless and without any moving parts. But wanted keep my high spec graphics and to have space in my Silverstone GW01 HTPC case full size cards etc.
I wanted to ask your opinion about an alternative way of achieving Chris' brief by using an Intel i7 Clarkdale 32 nm CPU (18W) and Mobo rather than the Atom setup. This i7 cpu could easily work with a fanless cpu cooler. It's more expensive than the Atom option but it offers more flexibility and power. What are your thoughts?

_____

Custom built HTPC with Lynx AES16e sound card -> Bryston BDA-1 -> BP-26/4BSST2 -> Harbeth SHL5 speakers & Chord Company interconnects and speaker leads

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Submitted by manisandher on Mon, 02/15/2010 - 10:32. Joined: 06/02/2009 .:. Offline .:. Comments: 322

All parts for C.A.P.S. now ordered

Hi Chris,

I've been meaning to put together a dedicated music PC for a while now, to replace the Sony laptop I currently use. And my requirements echoed yours to the letter... especially your no.12 and 13.

I've ordered all the necessary parts for the C.A.P.S., save the Origen case - I can get a black one right now from a UK retailer, but will need to wait for a silver one to arrive (and to get one shipped across from the US to UK adds around $190 to the price!). But hopefully the delay won't be too long. Also, instead of the Lynx card, I will use the PCI slot for a TI firewire card to connect to the Weiss AFI1.

Thanks for doing all the ground work.. it really has helped me out a lot. Will let you know how the C.A.P.S. compares to my laptop running on battery power.

Cheers,
Mani.

_____

Submitted by liorms on Mon, 02/15/2010 - 12:53. Joined: 04/20/2009 .:. Offline .:. Comments: 27

FW cards for linux

Hi baocrazy,

I assume your talking about the "Roma" player - did Daniel gave approximated date,spec, pricing for this device?
Thanks for the link to ffado.
Still I'm not sure how it is helping with locating the right FW pc card to fit into linux distro?
As all of the mentioned devices will connect into the FW card in the PC and they do not behave as a FW PC card.
And from reading @the next thread here - it was mentioned that the TI chipset is also not "perfect" and if you want to have a good solution you'll need a VIA chipset - this is confusing...
Can anyone attest on what FW PC card he's using to connect to the Weiss Minerva/DAC2 which proved to be a good solution? It will be even better if someone have found a MOBO that includes that port on-board ; that would leave the extra pci/e slot for other enhancement...

Thanks.,

Lior./

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Submitted by baocrazy on Tue, 02/16/2010 - 02:13. Joined: 02/12/2010 .:. Offline .:. Comments: 4

@Lior, He didn't referred

@Lior,

He didn't referred specifically to the roma music player and I never asked more about this Linux device.

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Submitted by manisandher on Mon, 02/15/2010 - 16:14. Joined: 06/02/2009 .:. Offline .:. Comments: 322

FW PC card

"Can anyone attest on what FW PC card he's using to connect to the Weiss Minerva/DAC2 which proved to be a good solution?"

The firewire card (TI chipset) built into my Sony laptop works fine with the Weiss AFI1 and Windows7/WASAPI. As too does the Lacie PCMCIA firewire 400/800 card (TI chipset).

I have an old 'Adaptec AFW-8300' firewire 400/800 PCI card (TI chipset) that I will use with the C.A.P.S. I'll let you know how that works out.

Mani.

_____

XXHighEnd -> W7 -> Zalman TNN300 with i7 -> RME AES-32 (slave) -> Pacific Microsonics Model Two (master)

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322

Wifi or Bluetooth… bad idea?

Chris, you said, "I control my servers with a MacBook Air that sits next to my listening chair."

So you're using Remote Desktop and connecting via a wireless network, right? Isn't this a bad idea, from a SQ perspective? Personally, I wouldn't want wifi or bluetooth anywhere near my music server. Indeed, I switch all the wireless devices in the house off for my late night listening sessions. Along with cleaner electricity at that time, I'm sure this makes a difference (even with a fully balanced system).

Interested in hearing anyone's thoughts on this.

Mani.

_____

XXHighEnd -> W7 -> Zalman TNN300 with i7 -> RME AES-32 (slave) -> Pacific Microsonics Model Two (master)

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Submitted by The Computer Au… on Tue, 02/16/2010 - 04:22. Joined: 11/28/2007 .:. Offline .:.
Comments: 6744

Hi Mani - For critical

Hi Mani - For critical listening I setup a play list and disconnect. The playlist also consist of audio copied to the local SSD.

My wireless router is not near my system. The server is connecting via wired Ethernet. I do know some people who turn down the power on their routers but I haven't A/B'd that yet.

_____

Chris Connaker

Founder
Computer Audiophile

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Submitted by liorms on Tue, 02/16/2010 - 08:39. Joined: 04/20/2009 .:. Offline .:. Comments: 27

XXHighEnd

Hi Mani,

I've noticed that you are using the XXHighEnd.
As far as i know - this works best on VISTA, which is not really popular nor confirms with HTPC build (HW wise).
Can you share your thoughts,experience on the software ; As I'm very interested in the engine/abilities.
Though, the GUI and platform are somewhat dis-encouraging.

Thanks,

Lior./

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